

**SOCIAL CAPITAL AND THE SECOND-GENERATION THEORIES  
OF COLLECTIVE ACTION: AN ANALYTICAL APPROACH TO THE FORMS OF  
SOCIAL CAPITAL**

by

**T. K. Ahn**

Workshop in Political Theory and Policy Analysis  
Indiana University

**Elinor Ostrom**

Department of Political Science  
Workshop in Political Theory and Policy Analysis  
Center for the Study of Institutions, Population, and Environmental Change  
Indiana University

Prepared for delivery at the 2002 Annual Meeting of the American Political Science Association, Boston, Massachusetts, August 29-September 1, 2002. Copyright by the American Political Science Association. We appreciate the support of the National Science Foundation.

**Workshop in Political Theory and Policy Analysis**

Indiana University, 513 North Park  
Bloomington, IN 47408-3895  
Phone: 812.855.0441 / Fax: 812.855.3150  
E-mail: [workshop@indiana.edu](mailto:workshop@indiana.edu)  
<http://www.indiana.edu/~workshop>

# **SOCIAL CAPITAL AND THE SECOND-GENERATION THEORIES OF COLLECTIVE ACTION: AN ANALYTICAL APPROACH TO THE FORMS OF SOCIAL CAPITAL**

**T. K. Ahn and Elinor Ostrom**

## **I. INTRODUCTION: TWO UNDERSTANDINGS OF SOCIAL CAPITAL**

Over the past decade, the idea of social capital has been utilized in multiple empirical studies that are of interest to most social scientists. More theoretically oriented scholars, however, participate in the social capital discourse as critics of the concept's ambiguity. Arrow (1999) asks in what sense social capital is a capital. Solow (1999) characterizes social capital research as plagued by "vague ideas" and "casual empiricism." Durlauf (1999, 2002, forthcoming) and Manski (2000) seem to agree with Solow.

The frequent efforts by social capital researchers to clarify the meaning of social capital (Foley and Bob, 1999; E. Ostrom and Ahn, 2001; Paxton, 1999; Portes, 1998; Putnam, 2000; Turner, 1999; Woolcock, 1998) have not yet been fully successful in making skeptics understand what social capital is, let alone converting them to agree with the theory's main ideas (Baron, Field, and Schuller, 2002). We do not think that the skepticism is totally ungrounded. We argue that the key step towards making social capital a less confusing concept is to clearly define it and relate it to the other forms of capital, to identify its forms, to clarify the meaning of each of the forms of social capital, to establish causal relationships among the forms of capital and their consequences for those sharing diverse combination of forms of social capital, to develop better measures of social capital, and to design stronger empirical studies to test social capital theories. This is more than we can do in one paper (or even one book). Thus, we will concentrate here on

an effort to clarify one of the key confusions we have noted in the way that social capital has been defined in the literature.

All forms of capital involve investments that increase the probability of higher returns from individual and joint efforts over a future time period. Physical capital is easier to understand as it involves deferring consumption in order to invest in physical infrastructure and tools that the investor(s) hope will increase the productivity of future activities. Physical capital is the easiest form of capital to measure given its objective form even though assigning a value to physical capital involves very similar problems to those of valuing other forms of capital. When scholars first introduced the concept of human capital (Schultz, 1961), it took time for the usefulness of this concept and ways of measuring it to be accepted. The concept of human capital is now recognized as a useful concept and a major factor in economic productivity.

Broadly speaking, social capital is a set of values and relationships created by individuals in the past that can be drawn on in the present and future to facilitate overcoming social dilemmas.<sup>1</sup> Those who directly benefit from their own or others' past efforts in building these patterns may be a small or large group. The externalities from the use of social capital may be positive (when a group of neighbors cleans up a neighborhood) or negative (when a gang of youth protect their turf) (see E. Ostrom, 1999 for a discussion of the dark side of social capital). Social capital reflects a way of conceptualizing how cultural, structural, and institutional aspects of small to large groups in a society interact and affect economic and political change. It is a core concept of a synthesizing framework that can be applied whenever collective endeavors of individuals are critical in achieving a collective goal.

---

<sup>1</sup> We do not mean this as a "functional" definition whereby social capital exists only if it produces a positive outcome. Durlauf (2002) points out that some definitions of social capital are too functional to be put under empirical scrutiny. We present the causal aspect of our theory in our discussion of the forms of social capital.

We identify *trustworthiness*, *networks*, and *institutions* as three basic forms of social capital. Alternative ways to refer to the forms of social capital exist, but we choose the concepts that are more commonly found in the collective action literature. This is because we believe that the theories of collective action, especially its second-generation versions that incorporate heterogeneous preferences of individuals, are the key building blocks in constructing a theoretically sound social capital perspective. Trustworthiness, networks, and institutions are capital in the broad sense that they serve as independent inputs to economic and political processes and outcomes. These forms of capital do not always satisfy the conditions for being capital that Arrow (1999) puts forward<sup>2</sup>, but neither do human and physical capital (for elaboration, see E. Ostrom and Ahn, forthcoming: Introduction).

We think that one of the most important reasons why the concept of social capital appears to be so ambiguous is an often-unnoticed divide within the social capital camp itself. One set of social capital researchers bestows priority to a group's cultural factors (summarized in this paper as people's trustworthiness). Others maintain the mainstream neoclassical approach in which values and cultural factors are epiphenomenal to structural incentives. The positive effect of social networks on facilitating collective action is well agreed upon. The fact that institutions can also have significant roles in cooperation is without doubt, even though whether or not to include institutions as a form of social capital is a matter under debate. The critical divide exists with regard to trust, trustworthiness, norms of reciprocity and their place in a causal framework of social capital. The difficulties involved in articulating the meanings of such concepts have hidden the potentially critical divide between the two approaches for understanding social

---

<sup>2</sup> Arrow puts forward three aspects implied by the concept of capital: "(a) extension in time; (b) deliberate sacrifice in the present for future benefit; and (c) alienability" (1999: 4).

capital. But when analytically acute critics try to understand and reconstruct causality implied in social capital theories, the often-implicit difference among the researchers of social capital frustrates the analyst's attempt.

We include characteristics of social structure and institutions as forms of social capital. But we take the non-reductionist view that trustworthiness – a term referring to the characteristics of individual preferences that facilitate individuals to behave cooperatively in social dilemmas even in the absence of structural and institutional incentives to do so – is not only a non-reducible but also a critical form of social capital. The difference between the two approaches to social capital are often subtle and a simple dichotomy does not fully capture it. Consider the following two quotes<sup>3</sup>:

Social capital can be defined simply as an instantiated set of *informal values* or norms shared among members of a group that permits them to cooperate with one another. (Fukuyama, 1999: 16; our italics)

... Social capital refers to *connections* among individuals – social *networks* and the norms of reciprocity and trustworthiness that arise from them.... A society of many virtuous but isolated individuals is not necessarily rich in social capital. (Putnam, 2000: 19; our italics)

Fukuyama is probably the strongest proponent of the primacy of cultural aspects in social capital.<sup>4</sup> Bowles and Gintis's (2002: 1, quoted in Durlauf, 2002: 2) view that "[S]ocial capital generally refers to trust, concerns for one's associates, a willingness to live by the norms of one's community and to punish those who do not" seems to be in agreement with that of Fukuyama. This view is also echoed by Donalson (2001: 5), who in his discussion of "the ethical wealth of nations" states that "... [M]orality may create an economic advantage for nations in ways

---

<sup>3</sup> We thank Durlauf (2002: 2) for quoting these two views side by side, even though his main purpose is not to contrast them.

<sup>4</sup> Also see Fukuyama (1995) in which he makes an explicit argument that culture defined as "values and habits" of individuals in a society is the critical factor affecting the society's economic performance.

broader than the notion of an idealized market.” Yamagishi’s (2001: 143-45) argument that the term “trust” be reserved for beliefs on others’ pure motivations – defined as trustworthiness in this paper – is a notion of trust that corresponds to this cultural view of social capital.

Interpreting the quote from Putnam is subtler. It depends on what he means by “norms of reciprocity and trustworthiness.” If they refer to Fukuyama’s “values,” then Putnam is arguing that connectedness changes individuals’ values. Putnam himself notes “[P]eople who have active and trusting connections to others --- develop or maintain character traits that are good for the rest of society. Joiners become more tolerant, less cynical, and more emphatic to the misfortunes of others” (Putnam, 2000: 288)

Another interpretation exists, however, that does not require values or value changes to explain norms of reciprocity and trustworthiness. It is a well-established result among game-theorists that certain characteristics of social structure tend to facilitate cooperation even without changes in payoff structures – such as repeated interactions among a set of actors and networks that convey information of actors’ intention and behavior to others within the network. The overall connectedness of a society, especially through what Granovetter (1973, 1985) calls “weak ties” facilitates collective action at a larger scale. If Putnam’s quote is interpreted as such, it is possible to reduce those moral and cultural concepts to the beliefs (trust), strategies (cooperation), and behavioral patterns (reciprocity) grown out of the fundamentally selfish incentives provided by social structure. Hardin’s (2002, forthcoming) “encapsulated interest” view of trust may be the notion of trust consistent with this view of social capital.

Economists have studied trust as a problem of reputation using various forms of repeated games. In those games, self-interested players sustain cooperation not because they care about others, but because they try to maximize their own gains over time (Fudenberg and Maskin,

1986; Kandori, 1992; Kreps and Wilson, 1982; Rubinstein, 1979; Tirole, 1996). Annen (2002) and Henning (2002) provide formal theories of social capital that describe how the various forms and degrees of connectedness, and the reputation effect stemming from them, result in cooperative behavior by individuals who are selfishly motivated. Social capital becomes, in this view, not much more than a new framing device for the theoretical results that have been well-known to economists for a long time. Using concepts such as trust, reciprocity, or culture to refer to such reputation effects may seem to obscure what is being argued; that is precisely the point Jackman and Miller (1996a, 1996b) make “against” social capital. (Also see Manski, 2000, who recommends that scholars economize on theoretical concepts.)

The problem arises when one aspect of social network effect, which has been the subject of reputation economics, is exclusively advocated as *the* theory of social capital. We think that the contrast should be made explicit to clear out the conceptual ambiguities surrounding the concept and to construct a general causal theory of social capital. In this paper, we develop a theory of social capital that is consistent with the non-reductionist view that takes heterogeneous individual values (or preferences) seriously. In our previous works on social capital (E. Ostrom and Ahn, 2001; E. Ostrom and Ahn, forthcoming: Introduction), we argued that the concept of social capital should be located in the framework of second-generation theories of collective action. In Section II, we discuss the second-generation theories of collective action as theoretical underpinnings of the non-reductionist approaches to social capital. In Section III, we discuss the three forms of social capital – trustworthiness, networks, and institutions – as they affect trust and collective action. Our focus will be on trust, since the subtle differences in understanding the meaning and sources of trust is the key in dividing reductionist and non-reductionist views on social capital. In Section IV, we discuss the subtleties in the concepts of trust and

trustworthiness. In our concluding Section V, we discuss future directions in the conduct of social capital research.

## **II. SECOND-GENERATION THEORIES OF COLLECTIVE ACTION**

The economic and political performances of societies, from villages to international communities, depend critically on how the members of a community solve the problem of collective action. Contemporary theorists of social capital, almost without exception, open their discourses on social capital by placing the problem of collective action at the center of economic and political problems. The linkage of collective-action theories and the social capital approach is, at best, incomplete up to now. Social capital researchers use the collective-action paradigm primarily to *frame* their research problems. Incorporating forms of social capital, such as trust/trustworthiness, networks, and institutions, into a collective-action framework is a frequent approach in narratives, but is less often used in analytically rigorous formal models.

Theories of collective action concern social dilemma settings in which there is a group of individuals, a common interest among them, and potential conflict between the common interest and each individual's interest (Olson, 1965). Collective-action problems arise whenever individuals face alternative courses of actions between short-term self-regarding choices and those that, if followed by a large enough number of individuals, benefit all. The problem is one of overcoming selfish incentives to achieve mutually beneficial results. Overcoming social dilemmas is not that easy; whatever others do, an individual is always better off by choosing not to cooperate with others. The game of the Prisoner's Dilemma is often used to characterize social

dilemma situations succinctly.<sup>5</sup> Social dilemmas have been considered the central problem of political science (E. Ostrom, 1998). As Arrow notes, even the basic and simple form of market transaction involves the problem of trust. Democratic governance also involves a variety of collective action problems at different scales that boundedly rational citizens must somehow confront and overcome (Lupia, McCubbins, and Popkin, 2000).

The first generation of collective-action theories (Olson, 1965; Hardin, 1968) concluded that individuals could not achieve joint benefits when left by themselves if they were in a situation where everyone would benefit whether or not they contributed to the effort. The ways of overcoming the supposed inability of individuals to solve these problems included regulation by an external authority, provision of selective incentives, or privatization. The first-generation collective-action theories were a valid criticism of the naive belief that individuals with common interests would voluntarily act to achieve those common interests, expressed by earlier group theorists such as Bentley (1949) and Truman (1958). Research on collective action has shown that the first-generation theories, while not entirely wrong, are partial theories rather than a general theory. They only represent the limiting case of the ways that collective-action situations are structured and how individuals cope with them (Blomquist, 1992; Bolton and Ockenfels, 2000; Feeny et al., 1990; McCay and Acheson, 1987; National Research Council, 2002 — to name just a few relevant studies).

In particular, the universal selfishness assumption of the first-generation theories has been repeatedly rejected by empirical research conducted in the field and the experimental laboratory (see E. Ostrom, 1998 for an overview of this research). One cannot, however, replace

---

<sup>5</sup> See E. Ostrom, Gardner, and Walker (1994) for other formal games representing broad sets of social dilemmas that are characteristic of efforts to govern and manage common-pool resources as well as extensive empirical research.

the universal selfishness assumption with a universal altruist assumption.<sup>6</sup> Individuals do exist, who are concerned only with their own immediate material gains, at the expense of others. At the same time, there is also a significant proportion of individuals who, in game-theoretic terms, have nonselfish utility functions or, in other words, have intrinsic preferences. They take into account other individuals' interests as well as their own in the decisions they make (Frey, 1994, 1997). Further, nonselfish individuals differ among themselves in terms of the extent to which they depart from purely selfish motivations. The actual choices of individuals in social dilemmas are strongly affected by various contextual factors (Frohlich et al., 2001).

Unlike first-generation theories of collective action that presuppose universal selfishness, second-generation collective-action theories acknowledge the existence of multiple types of individuals as a core principle of modeling human behavior (E. Ostrom, 1998, 2000). In addition to continuing to use standard noncooperative game theory — the key modeling tool of the first-generation collective-action theories — second-generation theories also use behavioral and evolutionary game theories (Camerer, 1997; Gintis, 2000; Henrich, 2000) as well as other evolutionary models (Kurzban, forthcoming). Many models of collective action based on behavioral or evolutionary game theories still use the solution concepts of the standard noncooperative game theory. They address new kinds of questions, however, that are particularly relevant to social capital research. For example, one of the main concerns of behavioral game theory is the problem of social motivations, which has a direct implication to the discussion of trust and trustworthiness in social capital research (see Glaeser et al., 2000). Another example is the problem of endogenous preferences, a key issue in evolutionary game-

---

<sup>6</sup> Frohlich and Oppenheimer (2000: 91) review their own earlier experiments where they found that self-interested behavior was the modal observed behavior, but that “other-regarding behavior was far from negligible. Averaging across the test dates, 57.3 of all subjects made some other-regarding choices.”

theoretic approach to collective action (Bowles, 1998, 2000; Güth and Yaari, 1992; Güth and Kliemt, 1998; Güth, Kliemt, and Peleg, 2000), that provides a way to model the historical interaction between the institutional structures and individual learning about how to be good citizens described by Putnam (1993) and by Frey and Stutzer (2002).

### **III. TRUST AND THE FORMS OF SOCIAL CAPITAL**

In spite of the concept's intuitive appeal, a lack of consensus concerning the exact meaning of trust complicates current discussion of social capital. The first problem is whether to define trust behaviorally or cognitively. Trust itself is a kind of belief but not an action *per se*.<sup>7</sup> Even in situations in which trusting immediately implies acting on that trust, the two are still conceptually distinct. Hardin (2002: 58-60) documents how often scholars fall into the trap of using the term trust as if it is an action. The kind of action resulting from trust can be called in several different ways depending on the context and emphasis. Cooperation is the standard terms in collective action situation in which a conditionally cooperative individual acts on a belief that others would also cooperate. To highlight that the action is based on trust, "entrusting" may be an acceptable term. Often times, especially in simple game models (e.g., see Bohnet, Frey, and Huck, 2001), modelers use trust to refer to an action, but this practice has more to do with communication with readers than the modelers' position on whether trust is an action or a belief. They would not, thus, we think, disagree that entrusting or cooperation is in fact a better term.

---

<sup>7</sup> Other cognitive terms such as assessment (Gambetta, 1988), expectation or even knowledge (Hardin, 2002) may be used. But knowledge is a rather too strong term. Because knowledge implies process and factual information while trust, even when the level of trust is extremely high, is a belief about things that are not yet observed. In this case, of course, the unobserved factor is the trustee's action. Knowledge of the factors that affect trustee's not-yet-observed behavior may serve as the basis for a very strong trust. But still, knowledge and belief are different. Trust is a belief to be verified, and often fails at that.

Second, those who understand trust as – consistent with lay view and dictionary definitions – a cognitive concept, diverge on their emphasis of the sources of trust. Many philosophers, sociologists, and psychologists have treated trust primarily as a personal disposition rather disjointed from the objective or rational basis.<sup>8</sup> The majority of researchers seem to treat trust as a kind of rational belief – in the sense of being grounded on the objective states of the world. Due to social and educational influences, an individual may have a higher level of trust than another, other things being equal. This possibility cannot be entirely dismissed. However, individuals also learn by experience and update their expectations. Overall, it is reasonable to assume that those experiences (including secondary, indirect experiences) will have to be reflected in a person’s expectation of the way others behave.

The key debate among those who agree on trust as a grounded expectation is over the primary sources of trust. Where does this expectation of certain behavior come from? Before discussing that, let us define the class of social situations in which trust matters. The situation can be summarized by what has been called the simple trust game – using the term “game” loosely as an action situation — which can be viewed as a modified sequential prisoner’s dilemma game (see Figure 1). We present a simple 2-person game – not because we think that most collective action problems are limited to 2-person situations -- but rather because a 2-person game helps us to illustrate the dilemma clearly.

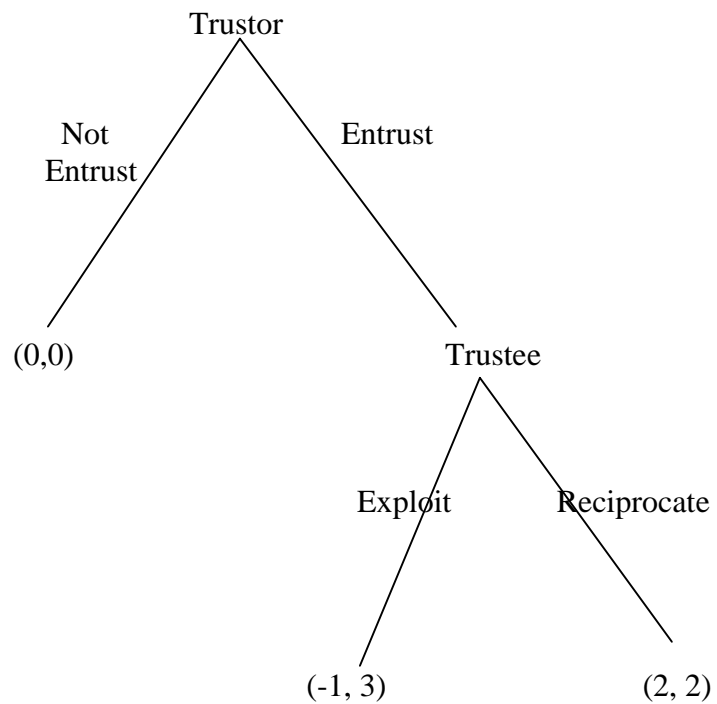
In the action situation depicted, a trustor must decide whether or not to take a certain action, which is generically called *entrusting*. If the trustor decides not to entrust, the status quo is maintained. If the trustor entrusts, it is the trustee’s turn to choose whether to reciprocate or exploit. Entrusting and reciprocating result in the mutually beneficial payoff set of (2,2). But the

---

<sup>8</sup> Again, Hardin (2002) provides a succinct and critical guide to several such views.

selfish incentives for the trustee is to exploit and obtain a payoff of 3, which leaves the trustor a payoff of  $-1$ . This is worse than the status quo. Note that the interactive decision tree of Figure 1 does not constitute a game in the strict game theoretic sense. The reason is the payoffs at the end of the decision tree are not final utilities but rather a form of socially-valued, objectively-measurable material objects (such as profits).

FIGURE 1. A Trust Situation



First, the trust situation involves another human actor who has the freedom to choose between at least two alternative actions once entrusted: one that is essentially reciprocal and the other essentially exploitative.<sup>9</sup> Of course we can easily envision a situation in which once entrusted, the trustee has a continuum of choices with two extremes of full reciprocation and complete exploitation. It is also possible that the trustor has a continuum of choices (as is often implemented in some experimental games – see, e.g., Glaeser et al., 2000).

Second, for the trustee, the choice of exploitation provides a higher material payoff. This rules out assurance games as relevant. In an assurance game, the belief of a first mover is that the second mover will choose an action that is consistent with the first mover's interest based on the second mover's interest and not on trustworthiness as such. In an assurance situation, two or more individuals' interests coincide. Thus, the only problem is for all to choose a coordinated action. The trust situation depicted in Figure 1 would change to an assurance situation if we changed the trustee's payoff of 3 following exploitation into something less than 2. Then the trustee's choice of reciprocating would generate the highest objective payoff not only for the trustor, but to trustee as well.<sup>10</sup> An example is that when we drive on a highway in the right lane and see a car approaching from the other side of the road (also on the right lane from the other car's perspective), we *believe* that the other driver will not change lanes. The reason for such a belief is of course that we tend to think that the other driver cares for his or her own life.

The three forms of social capital we propose – trustworthiness of people, social networks, and institutions – are three primary reasons for a trustee to behave reciprocally, as well as for a trustor to believe that the trustee would reciprocate. The two different approaches to social

---

<sup>9</sup> Those two actions may be called by different sets of names such as honoring and betraying (Bohnet, Frey, and Huck, 2001) or cooperating and defecting in a standard collective action terminology.

<sup>10</sup> Then of course, using the languages of trust situation would no longer appropriate.

capital discussed in Section I differ in terms of which among the three is central, which are secondary or even epiphenomenal, and what are the causal relationships among the three factors and between them and trust and collective action. Below we elaborate on the three sources that facilitate the outcome in which trustor entrusts and the trustee reciprocates.

*Trustworthiness.* By trustworthiness we refer to the characteristics of the trustee's preference. As numerous one-shot experiments using prisoner's dilemma type monetary payoff structures have shown (see, e.g., Ahn, Ostrom, and Walker, forthcoming), a significant number of individuals in the trustee's position do choose to reciprocate. At the same time, not all do. The fact that the magnitude of the gains from exploitation matters (Ahn et al., 2001; Clark and Sefton, 2001) indicates that individuals are distributed on a continuous scale of trustworthiness. In other words, the size of the internal parameter that the individual assigns to behaving in a trustworthy manner varies across individuals (Crawford and Ostrom, 1995). Behavioral game theorists (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) have developed formal models to reflect such motivational heterogeneity. While trustworthiness is an effective term to refer to the characteristics of individual preferences in a trust action situation, different terms may be used in other contexts. "Habits" are "values" (Fukuyama, 1995: 33-35) are such terms. In that context, the culture of a society is the preferences or the "habits and values" of individuals aggregated at a societal level.<sup>11</sup>

*Networks.* If the trust situation depicted in Figure 1 is repeated, or embedded in a social network composed of potential future partners of transaction, the trustee is more likely to reciprocate when entrusted. Many theoretical arguments, from Granovetter (1973) to Axelrod

---

<sup>11</sup> For a more precise formalization of culture in this manner, see Ahn (2001). For an earlier discussion of the habits of the heart and mind, see Tocqueville (1990) and V. Ostrom (1997).

(1981), have provided the logic behind such a result. Notice that individuals do not need to possess the character of trustworthiness defined in this paper, to refrain from exploiting a trustor in these contexts. Suggestively enough, the title of Axelrod's seminal article is "The Evolution of Cooperation among Egoists," implying that the repetition of the situation, not the intrinsic motivation of players, is the key facilitator of cooperation.

Ethnicity is frequently tightly associated with the concept of social capital – but it is the networks that ethnic groups may create that is a form of social capital rather than ethnicity as such. Landa (1994) carefully analyzes the strategies used by "ethnically homogeneous middle-men groups" – particularly Chinese traders – to develop codes of behavior and to sanction one another for known breaches of trust. Once a reputation for cooperative behavior is established, trust enables these ethnic networks to operate in many developing countries where institutions, such as courts and police, are weak or non-existent.

Part of the explanation for the effectiveness of the ethnic networks is based on reputation, but Landa stresses that importance of shared norms in making these networks effective as well. Reputation for trustworthiness enables members of an ethnic group to be trusted by outsiders. Ethnicity may be drawn on by individuals as an identifiable tag that is useful in making predictions about the trustworthiness of others in situations where participants know each other's ethnicity but not each other, and when an ethnic group has acquired a strong reputation for trustworthiness in particular types of situations. Whether ethnicity can be drawn on more generally to generate positive direct and indirect returns depends to a large extent on the forms of governance devised to encourage mutual tolerance and allow substantial self-organizing within a broad framework of law (V. Ostrom, 1979). In his recent book, Bates (2002) analyzes governance regimes in Africa where ethnicity has been used to organize violence against other

ethnic groups. Unfortunately, the human animal has a strong orientation to band “together” but also to band against those perceived to be “the others.” While ethnicity may be used as a source of social capital, it is first of all a group attribute. One has to make a case for how this attribute may be used by those holding it as a form of capital rather than simply assuming that it – and many other group attributes – *is* a form of social capital.

An individual embedded in a network of on-going relationships may not really care what happens to another member of a network who is temporarily in the position of the trustor. In fact, she might only care what happens to herself and she may want more of the material object that is at stake. But the trustee embedded in a network knows that it is in her interest not to *exploit*, but to *reciprocate* and keep the relationship going. Following that course of actions would generate a stream of income into the future, which is greater than the gains from an immediate exploitation. Networks with the capability of reliably transmitting information to others also encourage cooperative behavior. Other members of the network will be informed of what a trustee does now and probably condition their dealings with the trustee on the trustee’s current behavior. Therefore, though exploiting a trustor gives more to the trustee now, it limits the trustee’s chances to interact with others in the network and to reap future income within the network.

*Institutions.* Individuals have invested considerable time and effort into the crafting of a diversity of rules related to many collective action situations through all the ages. Institutions are the enforceable prescriptions used by groups of individuals in multiple forms of organizations, ranging in scale from the household to international regimes. Institutions are thus a very important form of social capital in that they may provide sufficient deterrents to greatly increase the likelihood that trustees will behave in reciprocal ways even when they face very high material temptations to break the trust placed in them. Like all forms of capital, institutions vary

in their strength and value. When a court system is judged by participants in market relationships to involve very high costs (in legal and illegal “fees” and delays), the presence of a court system does not effectively change the incentives of a trustee to yield to temptation.

Laws and the rules of an organization may reliably punish *exploitation* of others in a given trust situation and thus increase the likelihood of collective action. If I don’t send the merchandize you ordered on-line and that you have already paid for, you may report me as fraudulent to the relevant authorities, and I may be prosecuted. I fear that and when institutions are effective, I would rather *reciprocate* than *exploit*. You know that I know this (you have a positive expectation of being reciprocated by me when you entrust me), and thus entrust me.

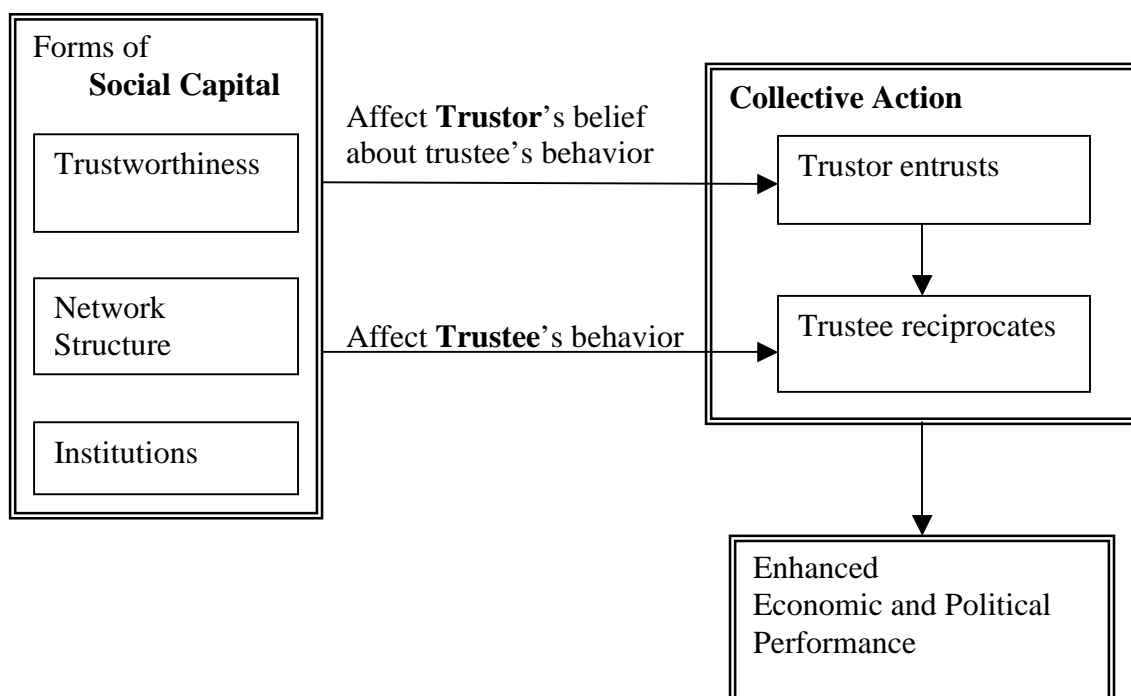
Thus, the general causal picture of Figure 2 shows how trustworthiness, networks, and institutions can operate to facilitate better outcomes in collective action situations. We think it is important to have this general theoretical overview of how these broad concepts are related. It is then time that we move on to more specific theoretical questions.

First, in order to understand the role of trustworthiness, networks and institutions in coping with collective action problems, one needs to identify diverse collective action problems. The problems involved in providing public goods differ from those involved in using a common-pool resource (see E. Ostrom, Gardner, and Walker, 1994). Considerable variation exists within common-pool resource problems depending on the scale, extent of storage, and variability of the resource (Blomquist, Schlager and Tang, 1994). The type of rules used effectively to cope with one problem may not be effective in coping with others (National Research Council, 2002). The number of people involved, their heterogeneity in regards to assets as well as preferences, whether there is a common understanding of the problem they face, the extent of overlap of the problem with either network structure or the jurisdiction of an institutional arrangement, all can

have an effect on how specific attributes of trustworthiness, networks, and institutions affect actions and outcomes over time.

Most likely there are complicated causal relationships among these three sources of trust. Creating, modifying and terminating institutions are higher-level collective action problems (Kiser and Ostrom, 1982) that may or may not be solved given a heterogeneous mixture of preferences and the collective choice or constitutional choice rules in use. The level of trustworthiness affects the viability, quality, and the effectiveness of particular institutional arrangements and network structures. The possibility of forming wider and denser social networks beyond immediate family and work relationships and the truthfulness of the information floating through the network channels may also depend on the level of trustworthiness of people (Dasgupta, 2002; Krishna, 2002).

FIGURE 2. Forms of Social Capital and Collective Action: A Simple Causal Model



On the other hand, networks may do more than provide additional incentive for behaving cooperatively to selfish individuals. As the indirect evolutionary game models show, the availability of information on transaction partners' types is critical for the survival and spread of trustworthy preferences (Ahn, 2001; Güth, Kliemt, and Peleg, 2000; Heiner, 2002). If that is the case, there is a causal direction from network to trustworthiness as the quote from Putnam in Section I implies. For now, however, we refrain from elaborating this complex causality, but, instead, treat the three sources as parallels. (For further discussion of the dynamic causalities of trust, trustworthiness, and networks, see Ahn, 2002).

Figure 2 summarizes a simple version of causality between the three forms of social capital, beliefs and behavior of individuals in a collective action situation, and political and economic consequences. The critical difference between the two approaches to social capital is whether or not trustworthiness is recognized as an independent, instead of epiphenomenal, reason for behaving in a reciprocal manner, and, thus, a basis for individuals' beliefs that a significant proportion of others would reciprocate once entrusted. The diagram of Figure 2 is a view that considers trustworthiness as at least an independent source of such behavior and beliefs.

#### **IV. TRUST AND TRUSTWORTHINESS**

The frequent appearance of such concepts as trust and trustworthiness in the two approaches to social capital hides their underlying differences. We do not propose that there is one "correct" way of using these concepts. But the criticisms that the entire conceptual scheme of social capital is too ambiguous will not decrease unless social capital theorists make it clear what they mean by trust and trustworthiness. Hardin is one of few scholars with clear position on

this matter, though his “reductionist” position is different from ours. Consider the following quote:

... [I]t is the high level of trustworthiness of people in my network that generates this benefit [from mutual cooperation]. Moreover, their trustworthiness is, on the encapsulated-interest account, the results of their having an interest in being trustworthy toward those with whom they have ongoing interactions that are beneficial and are likely to continue to be. ... More generally, what seems to concern most of the writers on social capital is such networks of relationships, so that one might call their social capital ‘network’ or ‘interpersonal’ capital. (Hardin, 2002: 84)

Hardin is right in saying that trustworthiness, not just trust, is a core form of social capital. But notice how his understanding of trustworthiness differs from ours. For us, trustworthiness refers to a person’s preference that makes the person reciprocate even in the absence of networks or institutional incentives to do so. Hardin, on the other hand, uses the term trustworthiness to refer to a behavioral tendency to cooperate, which in turn is rooted in structural incentives. We agree with Hardin that structural incentives facilitate cooperation. But we think that individuals’ intrinsic values are an independent reason for behaving cooperatively. Therefore, we prefer to reserve the term trustworthiness primarily to refer to such nonselfish motives.

The almost exclusive emphasis on structurally-induced incentives, rather than the genuine trustworthiness of people, seems to explain Hardin’s dismissal of the idea of “general trust.” General trust, borrowing Yamagishi’s (2001: 143) definition, is a baseline expectation of others’ trustworthiness.<sup>12</sup> We add, not necessarily reflecting Yamagishi’s view, that the generalized trust reflects the average level of trustworthiness in a society. If trustworthiness is

---

<sup>12</sup> Yamagishi’s discussion of trust focuses of its relationship with social intelligence; a higher level of social intelligence allows a person to entertain a correspondingly higher level of trust. This view seems to approach the view that considers trust as individual’s disposition. What is not clear in Yamagishi is whether a person’s default expectation of others’ trustworthiness also reflects the objective level of trustworthiness of others.

primarily an effect of networks and ongoing relationships, as Hardin argues, it truly is difficult to conceive of “general” trust or “average” level of trustworthiness. Then again, social capital itself is more or less irrelevant beyond the confines of a network. But if one acknowledges that among multiple communities of a comparable size, from villages to nations, the average trustworthiness of people may differ and it affects the way collective action problems are solved across communities, the concept of general trust and the underlying general trustworthiness become quite meaningful. Social capital can then become a useful rubric to refer to them along with other cooperation-enhancing factors for a society.

The potential of modern, market economies and democratic political orders make it imperative for the individuals to deal with others beyond the confines of intimate relations and close networks. Rather, the very condition for a successful market economy and democracy is that a vast number of people relate in a trustworthy manner when dealing with others – many of whom do not know one another and cannot incorporate repeated interaction or a network – to achieve collective actions of various scales. Many of these relationships can properly be characterized as a single-shot situation, or one that is repeated a very small number of times. The establishment and maintenance of such social relationships depends on the trustworthiness of people that cannot be explained away by the incentives provided by the structure.

We think that a key aspect of trust is the belief about others’ intrinsic motivation – trustworthiness. Putnam’s (2000: 136) “thin trust,” or Rahn and Transue’s (1998:545) “social, or generalized trust,” that gives a stranger the “benefit of doubt,” agree with our view of trust. However, outside the experimental laboratory, it is difficult to measure the marginal contribution of trust in this sense in the formation of one’s expectation of other’s behavior. It is usually a *configuration* of the intrinsic motivation, the surrounding social structure, and the possibility of

rule enforcement that influences an individual's decision whether or not to reciprocate when trusted. A trustor's expectation of trustee's behavior also takes into account this configuration of factors. Ahn (2002) proposes to restrict the term trust to beliefs of others' reciprocal behavior in situations in which incentives alone are not enough to induce such behavior among selfish individuals. Whether or not to reserve trust only for pure motivation is an issue worthy of debate. But we think it is quite awkward to use trust to refer to an expectation of others' cooperative behavior that is entirely based on the knowledge of the selfish incentives others face.<sup>13</sup>

## **V. FUTURE SOCIAL CAPITAL RESEARCH**

Similar to the joke about an adult hearing the definition of "prose," and confessing that he had not known that he had been speaking prose for so long, empirical studies of social capital have been undertaken for a long time by researchers who did not know that their research related to this concept. An important question raised by critics is whether the concept of social capital adds anything important to our discourse as social scientists – or whether we are just as well off studying trust and trustworthiness, networks, and institutions without linking them in a theory of social capital.

One can only answer this with the social scientist's favorite phrase – it depends. Several reasons exist for the importance of linking the studies of separate forms of social capital together in a broader theory. One of them has to do with theories of development. For most of the past five decades, scholars and public officials have viewed investment in physical capital – roads, power plants, dams, and factories – as *the* essential missing factor in development. Hence

---

<sup>13</sup> The reservation to call such belief trust is also echoed by Gambetta (1988: 224), who asks "Why should we bother about trust at all when cooperation can be generated by other means? One solution is ... concentrating instead on the manipulation of constraints and interest ..."

bilateral and multilateral donors have allocated billions of dollars to supply the “missing capital,” thought to be essential in kick-starting development in the poorer countries of the world.

Recognizing that institutions, networks, and trustworthiness are also forms of capital has changed the discourse (and some of the action) for donors in more recent years. World Bank studies show that investment in physical capital makes the most positive difference in societies where effective political and economic institutions exist and the level of trustworthiness and trust is high (Dollar and Easterly, 1999; Dollar and Svensson, 1998). Viewing institutions as a form of capital has two consequences. First, it increases the importance of building strong institutions in the view of some analysts. Second, the time dimension involved in building institutions is emphasized when one sees this effort as building a form of capital.

Further, recognizing that diverse concepts and entities are related to one another in a more general theoretical framework does not reduce the importance of studying the individual parts. Scientific understanding has advanced both by digging into the particulars as well as by linking what has been viewed as unrelated processes and entities into a more general theory. Given the diversity of social dilemmas that exist in all societies, developing better theories of how individuals overcome some of these problems is a major contribution. Why do some people in some locations overcome the temptations involved and garner higher levels of benefits, while others find themselves mired in an absence of coping mechanism, or worse, in escalating conflicts in which collective action within a group is directed primarily toward harming others? Ostrom (2001) lays out an initial theory addressing these questions in regard to overcoming collective action problems related to the long-term use of common-pool resources.

For many purposes, research on individual forms of capital should be encouraged whether or not the research is self-consciously linked to a broader concept. Entire sub-fields

have focused productively on questions related to diverse types of physical infrastructure without always tying back to the general theory of capital formation. Similarly, studies of alternative forms of education are valuable whether or not they tie back to the theory of human capital formation. Since there are multiple forms of all kinds of capital – research related to specific forms of capital can be one way of growing useful knowledge.

It is also useful to recognize that social capital researchers share some common problems with all scholars interested in capital. One of these is its measurement! Some scholars have criticized social capital research for the difficulty in getting good measurements of it. This is indeed a major problem, but not one that is unique to social capital as contrasted to physical or human capital. For all types of capital, it is easier to measure a particular *form* of capital as contrasted to measuring its *value* at a particular time and place.

When a business firm first acquires a new physical plant, for example, the form is measured in regard to the plant's physical size, capacity and location in relationship to a market. This looks easy. But, assigning a value to a physical plant turns out to be a non-trivial problem. One method of assigning value is using the nominal cost of the investment as the “value” of the plant. If, however, a firm has paid substantially more than the market value for a new plant, the “value” of this asset on the books may enable a corporation to give an entirely false picture its business health. As we have seen recently, the rules related to accounting practices in the United States have not served to encourage honest practices among the management of some of the country's major firms. This is leading to a major decline in the trust of investors as they have exited the stock market in droves. (This would make an interesting study of the impact of institutions on trustworthiness and consequently on trust and eventually on economic performance as sketched in Figure 2.)

The relationship between the social capital aspect of a modern corporation and its on-going value has been a topic examined by institutional economists since the days of Commons and Veblen. The social capital of a modern corporation is called its “good will.” The valuation assigned to the good will of a going concern has been subject to major legal battles ever since the concept of a corporation as a legal personality with standing in the courts has evolved (Commons, 1968). Commons explained the relationship between institutions (working rules), the presence of good will, and the value of a going concern:

That which holds the going concern together is these two sets of working rules affording an expectation of a gross income to be obtained jointly while it is being distributed among the members. This forecast is based upon business connections, patronages, goodwill, built up in the past and expected to continue or enlarge in the future as long as the working rules continue. If the expectation fails, the immortality fails. While the expectation continues, the corporation is a ‘going concern’. (Commons, 1968: 145)

The two sets of working rules (institutions) referred to by Commons are the internal working rules of the corporation itself and the external rules that define the rights and duties of external public officials in their relationships with a private corporation. Commons is basically asserting that whether a firm continues to solve collective action problems (“an expectation of gross income to be obtained jointly”) depends on two sets of working rules (management rules and external rules), the trustworthiness of the members of the enterprise, its network of connections, and whether its products are valued by its patrons more than their costs. Without these attributes, the corporation no longer solves a collective action problem and fails. Social capital is not immortal and depends on all of these causal factors continuing to work effectively in an ever-changing environment. At the time of failure, determining the value of various capital components of a firm is extremely difficult and the subject of many court cases.

What is essential in the conduct of future research related to social capital is that we pay close attention to the meaning of the various components of social capital, especially when doing large-scale statistical studies. While the aggregate measures of generalized trust and other group attributes obtained by large-scale surveys have frequently reported positive relationships with aggregate economic performance (Knack and Keefer, 1997), these types of studies have received some important criticisms related to the problems of identifiability (Durlauf, forthcoming; Manski, 2000). One has to be very certain that the group attribute that one has chosen as a proxy measure for social capital is not so related to other group-level variables that one cannot sort out whether social capital or some other group variable is the relevant cause of a relationship.

Further, responses to survey questions on trust have not proven to be good predictors of individual cooperative behavior in experimental dilemma situations. Ahn et al. (forthcoming) conducted a survey using the same questions used repeatedly in the General Social Survey. One month later, they recruited a subset of subjects to undertake a one-shot PD experiment. Using a logit model, and regressing the decision to cooperate on dummy variables for game and player type, as well as the trust measure, they found no systematic significant coefficient for any of the survey responses.

In an ambitious study of the relationship between responses to survey questions and behavior in experimental settings, Glaeser et al. (2000) developed an extensive instrument that also included the generalized trust questions repeatedly used in national surveys. In their experiments, the standard attitudinal questions generally did not predict subject choices when they were the first player in a trust game. Rather, those questions were more successful in predicting the trustworthiness of the second player. Further, they found that measures of a respondent's past trusting behavior performed far better than the attitudinal questions in

predicting trust and trustworthiness in the experiments. Experimental research will be one of the important methods used more heavily in the future to explore the relationship between various forms of social capital as they impact on behavior in social dilemma situations (see E. Ostrom and Walker, forthcoming; Eckel and Wilson, forthcoming; Yamagishi, forthcoming; McCabe and Smith, forthcoming).

While there are many problems involved in developing better empirical measures of diverse forms of social capital, encouraging signs indicate that research in this field is progressive in nature. Effective criticism and response is a sign of health. Further, scholars are using multiple theoretical and empirical tools to examine social capital and its consequences. The authors of this paper recently participated in the 2002 Public Choice Society meetings. One of the authors served as a discussant of a panel titled “Social Capital.” The four papers presented to the panel included one very mathematical work on network effects of economic transactions, one on experimental work on trust and cooperation, and two using various survey data to statistically test the relationships among several variables related to social capital. The strength of social capital research lies precisely in this diversity of methods and subjects.

It is now more or less agreed upon that the overarching substantive concern of social capital researchers is the political and economic performances of human communities at different scales. But what provides the common theoretical thread to this diversity? We believe that we have made, in this paper, a case for the co-development of second-generation collective action theories and social capital research that pays attention to the cultural as well as the economic aspects that enable a “society” of two persons or of much greater size to cope with the social dilemmas pervading all life.

## References

- Ahn, T. K. 2001. "The Conspiracy of Doves." Working paper W01-12. Bloomington: Indiana University, Workshop in Political Theory and Policy Analysis.
- Ahn, T. K. 2002. "Trust and Collective Action: Concepts and Causalities." Paper prepared for delivery at the 2002 Annual Meeting of the American Political Science Association, Boston, August 28-September 1, 2002.
- Ahn, T. K., Elinor Ostrom, and James Walker. Forthcoming. "Incorporating Motivational Heterogeneity into Game Theoretic Models of Collective Action." *Public Choice*.
- Ahn, T. K., Elinor Ostrom, David Schmidt, and James Walker. Forthcoming. "Trust in Two Person Games: Game Structure and Linkage." In *Trust, Reciprocity, and Gains from Association: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker. New York: Russell Sage Foundation.
- Ahn, T. K., Elinor Ostrom, David Schmidt, Robert Shupp, and James Walker. 2001. "Cooperation in PD Games: Fear, Greed, and History of Play." *Public Choice* 106(1/2):137-155.
- Annen, Kurt. 2002. "Social Capital, Inclusive Networks, and Economic Performance." Paper presented at the 2002 Meeting of the Public Choice Society, San Diego, California, March 22-24.
- Arrow, Kenneth. 1972. "Gifts and Exchanges." *Philosophy and Public Affairs* 1(4): 343-62.
- . 1999. "Observations on Social Capital." In *Social Capital: A Multifaceted Perspective*, eds. Partha Dasgupta and Ismail Serageldin, 3-5. Washington, D.C.: The World Bank.
- Axelrod, Robert. 1981. "The Emergence of Cooperation among Egoists." *American Political Science Review* 75(2): 306-18.
- Baren, Stephen, John Field, and Tom Schuller. 2002. *Social Capital: Critical Perspectives*. Oxford: Oxford University Press.
- Bates, Robert H. 2002. *Prosperity & Violence: The Political Economy of Development*. New York: W.W. Norton & Company.
- Bentley, A. 1949. *The Process of Government*. Evanston, IL: Principia Press.
- Blomquist, William. 1992. *Dividing the Waters: Governing Groundwater in Southern California*. San Francisco, CA: ICS Press.

- Bohnet, Iris, Bruno S. Frey, and Stephen Huck. 2001. "More Order with Less Law: On Contract Enforcement, Trust, and Crowding." *American Political Science Review* 95: 131-44.
- Bolton, Gary, and Axel Ockenfels. 2000. "ERC: A Theory of Equity, Reciprocity, and Competition." *American Economic Review* 90: 166-93.
- Bowles, Samuel. 1998. "Endogenous Preferences: The Cultural Consequences of Markets and other Economic Institutions." *Journal of Economic Literature* 36 (March): 75-111.
- . 2000. "Individual Interactions, Group Conflicts, and the Evolution of Preferences." In *Social Dynamics*, eds. Steve Durlauf and Peyton Young. Washington, D.C.: Brookings Institutions.
- Bowles, Samuel, and Herbert Gintis. 2002. "Social Capital and Community Governance." *Economic Journal*.
- Camerer, Colin F. 1997. "Progress in Behavioral Game Theory." *Journal of Economic Perspectives* 11(4): 167-88.
- Clark, Kenneth, and Martin Sefton. 2001 "The Sequential Prisoner's Dilemma: Evidence on Reciprocation." *Economic Journal* 111: 51-68.
- Commons, John R. 1968. *Legal Foundations of Capitalism*. Madison: University of Wisconsin Press.
- Crawford, Sue E. S. and Elinor Ostrom. 1995. "The Grammar of Institutions." *American Political Science Review* 89(3) (September): 582-600.
- Dasgupta, Patha. 2002. "Economic Progress and the Idea of Social Capital." In *Social Capital: A Multifaceted Perspective*, eds. Patha Dasgupta and Ismail Serageldin, 325-424. Washington, D.C.: The World Bank. (A revision is reproduced in Elinor Ostrom and T. K. Ahn, eds. *Social Capital: A Reader*. London: Edward Elgar, forthcoming 2003.)
- Dollar, David and William Easterly. 1999. "The Search for the Key: Aid, Investment and Policies in Africa." Policy Research Working Paper 2070. Washington, D.C.: The World Bank.
- Dollar, David, and Jakob Svensson. 1998. "What Explains the Success of Failure of Structural Adjustment Programs?" Policy Research Working Paper 1938. Washington, D.C.: The World Bank.
- Donalson, Thomas. 2001. "The Ethical Wealth of Nations." *Journal of Business Ethics* 31(1): 25-36.
- Durlauf, Steven N. 1999. "The Case 'Against' Social Capital." *Focus* 20(3): 1-5.

- \_\_\_\_\_. 2002. "Bowling Alone: A Review Essay." *Journal of Economic Behavior & Organization* 47(3): 259-74.
- \_\_\_\_\_. Forthcoming. "On the Empirics of Social Capital." *Economic Journal*.
- Eckel, Catherine C., and Rick K. Wilson. Forthcoming. "The Human Face of Game Theory: Trust and Reciprocity in Sequential Games." In *Trust, Reciprocity, and Gains from Association: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker. New York: Russell Sage Foundation.
- Feeny, David, Fikret Berkes, Bonnie J. McCay, and James M. Acheson. 1990. "The Tragedy of the Commons: Twenty-Two Years Later." *Human Ecology* 18(1): 1-19.
- Fehr, Ernst, and Klaus Schmidt. 1999. "A Theory of Fairness, Competition, and Cooperation." *Quarterly Journal of Economics* 114: 817-68.
- Foley, Michael W., and Bob Edwards. 1999. "Is it Time to Disinvest in Social Capital?" *Journal of Public Policy* 19(2): 141-73.
- Frey, Bruno S. 1994. "How Intrinsic Motivation is Crowded Out and In." *Rationality and Society* 6: 334-52.
- Frey, Bruno S. and Alois Stutzer. 2002. *Happiness and Economics. How the Economy and Institutions Affect Human Well-Being*. Princeton, N.J.: Princeton University Press.
- Frohlich, Norman and Joe Oppenheimer. 2000. "How People Reason about Ethics." In *Elements of Reason. Cognition, Choice, and the Bounds of Rationality*, eds. Arthur Lupia, Mathew D. McCubbins, and Samuel Popkin, 85-107. Cambridge: Cambridge University Press.
- Frohlich, Norman, and Joe Oppenheimer, with Anja Kurki. 2001a. "Problems in Modeling Social Preferences: Insights from Modified Dictator Experiments." Presented at the 2001 meeting of the Economic Science Association meetings, Barcelona, Spain, June 21-24.
- Frohlich, Norman, Joe Oppenheimer, and Bernard Moore. 2001b. "Some Doubts about Measuring Self-Interest Using Dictator Experiments: The Costs of Anonymity." *Journal of Economic Behavior and Organization* 46(3) (November): 271-90.
- \_\_\_\_\_. 1997. *Not Just for the Money: An Economic Theory of Personal Motivation*. Cheltenham, UK: Edward Elgar.
- Fudenberg, Drew, and Eric Maskin. 1986. "The Folk Theorem in Repeated Games with Discounting or with Incomplete Information." *Econometrica* 54: 533-54.

- Fukuyama, Francis. 1995. *Trust: The Social Virtues and the Creation of Prosperity*. New York: The Free Press.
- \_\_\_\_\_. 1999. *The Great Disruption*. New York: Simon and Schuster.
- Gambetta, Diego. 1988. "Mafia: The Price of Distrust." In *Trust: Making and Breaking Cooperative Relations*, ed. Diego Gambetta, 158-75. London: Basil Blackwell.
- Gintis, Herbert. 2000. *Game Theory Evolving*. Princeton, NJ: Princeton University Press.
- Glaeser, Edward L., David I. Labson, José A. Scheinkman, and Christine L. Soutter. 2000. "Measuring Trust." *The Quarterly Journal of Economics* August: 811-846.
- Granovetter, Mark S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78: 1360-80.
- \_\_\_\_\_. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 90: 481-510.
- Güth, Werner, and Hartmut Kliemt. 1998. "The Indirect Evolutionary Approach: Bridging the Gap Between Rationality and Adaptation." *Rationality and Society* 10(3): 377-99.
- Güth, Werner, Hartmut Kliemt, and Bezalel Peleg. 2000. "Co-evolution of Preferences and Information in Simple Games of Trust." *German Economic Review* 1(1): 83-110.
- Güth, Werner, and Menahem Yaari. 1992. "An Evolutionary Approach to Explaining Reciprocal Behavior in a Simple Strategic Game." In *Explaining Process and Change: Approaches to Evolutionary Economics*, ed. Ulrich Witt, 23-34. Ann Arbor: University of Michigan Press.
- Hardin, Garrett. 1968. "The Tragedy of the Commons." *Science* 162 (Dec): 1243-48.
- Hardin, Russell. 2002. *Trust and Trustworthiness*. New York: Russell Sage Foundation.
- \_\_\_\_\_. Forthcoming. "Gaming Trust." In *Trust, Reciprocity, and Gains from Association: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker. New York: Russell Sage Foundation.
- Heiner, Ron. 2002. "Robust Evolution of Contingent-Cooperation in Pure One-Shot Prisoners' Dilemmas." Working paper. Fairfax, VA: James Buchanan Center for Political Economy.
- Henning, Christian H.C.A. 2002. "On the Conception of Social Capital in the Framework of a Generalized Version of Coleman's Linear System of Action." Paper presented at the 2002 Meeting of the Public Choice Society, San Diego, California, March 22-24.

- Henrich, Joe. 2000. "Cultural Group Selection and Coevolutionary Processes Explain Human Prosociality and Large-Scale Cooperation." Working paper. Ann Arbor: University of Michigan.
- Jackman, Robert W., and Ross A. Miller. 1996a. "A Renaissance of Political Culture?" *American Journal of Political Science* 40(3): 632-50.
- Jackman, Robert W., and Ross A. Miller. 1996b. "The Poverty of Political Culture." *American Journal of Political Science* 40(3): 697-716.
- Kandori, Michihiro. 1992. "Social Norms and Community Enforcement." *Review of Economic Studies* 59: 63-80.
- Knack, Stephen and Philip Keefer. 1997. "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation." *Quarterly Journal of Economics* 112(4): 1251-88. (Reproduced in Elinor Ostrom and T. K. Ahn, eds. *Social Capital: A Reader*. London: Edward Elgar, forthcoming 2003.)
- Kreps, David M. 1990. "Corporate Culture and Economic Theory." In *Perspectives on Positive Political Economy*, eds. James Alt and Kenneth A. Shepsle, 90-143. Cambridge: Cambridge University Press.
- Kreps, David M., and Robert Wilson. 1982. "Reputation and Imperfect Information." *Journal of Economic Theory* 27: 253-79.
- Krishna, Anirudh. 2002. *Active Social Capital. Tracing the Roots of Development and Democracy*. New York: Columbia University Press.
- Kurzban, Robert. Forthcoming. "Biological Foundations of Reciprocity." In *Trust, Reciprocity, and Gains from Association: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker. New York: Russell Sage Foundation.
- Landa, Janet T. 1994. *Trust, Ethnicity, and Identify: Beyond the New Institutional Economics of Ethnic Trading Networks, Contract Law, and Gift-Exchange*. Ann Arbor: University of Michigan Press.
- Lupia, Arthur, Mathew D. McCubbins, Samuel L. Popkin. 2000. *Elements of Reason. Cognition, Choice, and the Bounds of Rationality*. Cambridge: Cambridge University Press.
- Manski, Charles F. 2000. "Economic Analysis of Social Interactions." *Journal of Economic Perspectives* 14(3): 115-36.
- McCabe, Kevin A., and Vernon L. Smith. Forthcoming. "Strategic Analysis by Players in Games: What Information do They Use?" In *Trust, Reciprocity, and Gains from*

- Association: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker. New York: Russell Sage Foundation.
- McCay, Bonnie J., and James M. Acheson. 1987. *The Question of the Commons: The Culture and Ecology of Communal Resources*. Tucson: University of Arizona Press.
- National Research Council. 2002. *The Drama of the Commons*. Washington, D.C: National Academy Press.
- Olson, Mancur. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press.
- Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.
- \_\_\_\_\_. 1998. "A Behavioral Approach to the Rational Choice Theory of Collective Action." *American Political Science Review* 92(1) (March): 1-22.
- \_\_\_\_\_. 1999. "Social Capital: A Fad or a Fundamental Concept?" In *Social Capital: A Multifaceted Perspective*, eds. Partha Dasgupta and Ismail Serageldin, 172-214. Washington, D.C.: The World Bank.
- \_\_\_\_\_. 2000. "Collective Action and the Evolution of Social Norms." *Journal of Economic Perspectives* 14(3) (Summer): 137-58.
- \_\_\_\_\_. 2001. "Reformulating the Commons." In *Protecting the Commons: A Framework for Resource Management in the Americas*, eds. Joanna Burger, et al., 71-89. Washington, D.C.: Island Press.
- Ostrom, Elinor, and T. K. Ahn, eds. Forthcoming 2003. *Social Capital: A Reader*. London: Edward Elgar.
- Ostrom, Elinor, and T. K. Ahn. 2001. "A Social Science Perspective on Social Capital." A Report commissioned by the Enquete Commission of the German Federal Government.
- Ostrom, Elinor, Roy Gardner, and James Walker. 1994. *Rules, Games, and Common-Pool Resources*. Ann Arbor: University of Michigan Press.
- Ostrom, Elinor, and James Walker, eds. Forthcoming. *Trust, Reciprocity, and Gains from Association: Interdisciplinary Lessons from Experimental Research*. New York: Russell Sage Foundation.
- Ostrom, Vincent. 1979. "Federal Principles of Organization and Ethnic Communities." In *Federalism and Political Integration*, ed. Daniel Elazar, 73-86. Ramat Gan, Israel: Turtledove Publishers.

- \_\_\_\_\_. 1997. *The Meaning of Democracy and the Vulnerability of Democracies: A Response to Tocqueville's Challenge*. Ann Arbor: University of Michigan Press.
- Paxton, Pamela. 1999. "Is Social Capital Declining in the United States? A Multiple Indicator Assessment." *American Journal of Sociology* 105: 88-127.
- Portes, Alejandro. 1998. "Social Capital: Its Origins and Applications in Modern Sociology." *Annual Review of Sociology* 24: 1-24.
- Putnam, Robert (with Robert Leonardi and Raffaella Nanetti). 1993. *Making Democracy Work*. Princeton, NJ: Princeton University Press.
- Putnam, Robert. 2000. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster.
- Rubinstein, Ariel. 1979. "Equilibrium in Supergames with the Overtaking Criterion." *Journal of Economic Theory* 21: 1-9.
- Schultz, Theodore W. 1961. "Investment in Human Capital." *American Economic Review* 51(1): 1-17. (Reproduced in Elinor Ostrom and T. K. Ahn, eds. *Social Capital: A Reader*. London: Edward Elgar, forthcoming 2003.)
- Solow, Robert M. 1999. "Notes on Social Capital and Economic Performance." In *Social Capital: A Multifaceted Perspective*, eds. Partha Dasgupta and Ismail Serageldin, 6-9. Washington, D.C.: The World Bank.
- Tirole, Jean. 1996. "A Theory of Collective Reputations (with Applications to the Persistence of Corruption and to Firm Quality)." *Review of Economic Studies* 63(1): 1-22.
- Tocqueville, Alexis de. [1840] (1945). *Democracy in America*. New York: Alfred A. Knopf. (Reproduced in Elinor Ostrom and T. K. Ahn, eds. *Social Capital: A Reader*. London: Edward Elgar, forthcoming 2003.)
- Truman, D.B. 1958. *The Governmental Process*. New York: Knopf.
- Turner, Jonathan H. 1999. "The Formation of Social Capital." In *Social Capital: A Multifaceted Perspective*, eds. Partha Dasgupta and Ismail Serageldin, 94-146. Washington, D.C.: The World Bank.
- Woolcock, Michael. 1998. "Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework." *Theory and Society* 27(2): 151-208.
- Yamagishi, Toshio. 2001. "Trust as a Form of Social Intelligence." In *Trust in Society*, ed. Caren Cook, 121-47. New York: Russell Sage Foundation.

Yamagishi, Toshio. Forthcoming. "Cross-Societal Experimentation on Trust: Comparison of the United States and Japan." In *Trust, Reciprocity, and Gains from Association: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker, 465-503. New York: Russell Sage Foundation.